DEPARTMENTS.

SOLUTIONS OF PROBLEMS.

ALGEBRA.

Problems 189 and 190 were also solved by L. E. Newcomb, Los Gatos, California.

190. Proposed by A. H. HOLMES, Brunswick, Maine.

Find the general term of the series 2, 3, 7, 46, 2112, etc.

Solution by G. B. M. ZERR, A. M., Ph. D., Parsons, W. Va., and GRACE M. BAREIS, Miss Roney's School, Bala. Pa.

Denoting the $n+1$st term by T_{n+1}, we have the recursion formula $T_{n+1}=T_n^2-n$.

191. Proposed by NELSON L. RORAY, Bridgeton, N. J.

Find a number such that if it be multiplied by 2, 3, 4, 5, and 6, the cyclical order of its digits will not be changed.

Remark by L. E. DICKSON, Ph. D., The University of Chicago.

The answer is the period 142857, of the fraction $\frac{1}{7}$. Solved in the MONTHLY of 1895, p. 13, Algebra problem number 32.

GEOMETRY.

Problem 212 was also solved by F. D. Posey, A. B., San Mateo, California.
Problem 213 was also solved by L. E. Newcomb, Los Gatos, California, and F. D. Posey, A. B., San Mateo, California.

215. Proposed by M. J. NEWELL, A. M., Evanston High School, Evanston, Ill.

No satisfactory solution has been received.

216. Proposed by JOHN J. QUINN, Warren High School, Warren, Pa.

Find, by plane geometry, the sides of a right triangle if the hypotenuce is 35, and the side of the inscribed squre is 12.

Solution by L. E. DICKSON, Ph. D., The University of Chicago.

"The inscribed square" to a right triangle is open to two interpretations: (1) the square has a side lying along the hypotenuse; (2) the square has two sides lying along the legs of the right triangle. For (1), the present problem is impossible (see problem 221). For the interpretation (2), denote the legs by a and b, $a \gtreqless b$, whence $a^2+b^2=35^2$. By similar triangles, $a-12:12=a:b$, whence $ab=12(a+b)$. Adding and subtracting twice the latter from $a^2+b^2=1225$, we get

$$(a+b)^2-24(a+b)=1225, \quad (a-b)^2=1225-24(a+b).$$